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Behavior Based Safety Implementation Using the DO IT Method at Pertamina in Makassar City

Implementasi *Behavior Based Safety* dengan menggunakan metode DO IT pada Pertamina di Kota Makassar

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Abstract
The application of Behavior Based Safety (BBS) in an effort to reduce the potential risk of accidents has been widely applied in various industries. However, its application with the DO IT (Define, Observed, Intervene Test) method to change unsafe behavior is still rarely implemented. The purpose of the research is how to identify the stages of implementing Behavior Based Safety (BBS) with the DO IT method, what forms of intervention are given in an effort to modify worker behavior for Pertamina officers in of Makassar. This type of research is quantitative with an observational approach. With behavior-based safety using the DO IT method Data collection is done by observation, reviewing documents, and interviews. The Observe stage is to observe the behavior that has been determined, obtained an initial score that the rate of PPE application among the workers was 66,6%. most workers had shown safe behavior (56,6%). Safety briefing was conducted at the Daily Section of the Pertamina. The results, it was found that, with regard to the compliance with operation procedure , most workers had shown safe behavior (53,3%). Based on the research results, the DO IT method is an effective and efficient method for industries that do not yet have a good occupational safety and health management system in a company. This study recommends that companies apply the do it method and strengthen oversight and monitoring related to safety behavior in preventing work accidents and increasing employee work productivity.

Abstrak
Penerapan *Behavior Based Safety* (BBS) dalam upaya mengurangi potensi risiko kecelakaan telah banyak diterapkan di berbagai industri. Namun, penerapannya dengan metode DO IT (*Define, Observed, Intervene Test*) untuk merubah perilaku unsafe masih jarang diterapkan. Tujuan dari penelitian ini adalah bagaimana mengidentifikasi tahapan penerapan Behavior Based Safety dengan metode DO IT, bentuk intervensi apa saja yang diberikan dalam upaya memodifikasi perilaku pekerja pada petugas Pertamina di Kota Makassar. Jenis penelitian ini adalah kuantitatif dengan pendekatan observasional. dengan behavior based safety menggunakan metode DO IT Pengumpulan data dilakukan dengan observasi, telaah dokumen, dan wawancara. Tahap Observe yaitu mengamati perilaku yang telah ditentukan, diperoleh skor awal bahwa tingkat penerapan APD pada pekerja sebesar 66,6%. sebagian besar pekerja telah menunjukkan perilaku aman (56,6%). *Safety briefing* dilakukan di Bagian Harian Pertamina Hasil penelitian menunjukkan bahwa, berkaitan dengan kepatuhan terhadap prosedur operasi, sebagian besar pekerja telah menunjukkan perilaku aman (53,3%). Berdasarkan hasil penelitian, metode DO IT merupakan metode yang efektif dan efisien bagi industri yang belum memiliki sistem manajemen keselamatan dan kecelakaan kerja yang baik pada suatu perusahaan. Penelitian ini merekomendasikan agar perusahaan menerapkan metode DO IT dan memperkuat pengawasan dan pemantauan terkait perilaku keselamatan dalam mencegah kecelakaan kerja dan meningkatkan produktivitas kerja karyawan.

Graphical Abstract

Keyword
do it method; health behavior; industry; observed; occupational health

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INTRODUCTION

The direct cause of accidents comes from unsafe acts which account for about 80% and unsafe conditions which account for about 18% (Mohajeri et al., 2022). International Labor Organization (2018) estimates that around 2.78 workers die from work-related accidents or diseases every year with more than 380,000 (13.7%) deaths due to work accidents. Non-fatal work accidents can occur more than fatal with an estimated 375 million workers with non-fatal accidents every year and of course there are serious consequences for workers' income. Based on data in Indonesia, there were 77,295 work accident cases throughout 2019, this shows a decrease from 2018, which was 173,105 cases and 2017, which was 123,041 cases (BPJS Ketenagakerjaan, 2019). Therefore, the key to eliminating accidents is to implement behavior based safety as a proactive prevention of potential hazards in the workplace. If each individual has implemented behavior-based safety, it is hoped that a safety culture can be created in the workplace so that the risk of accidents can decrease.Human error is related to safety behavior and unsafe behavior (Adi et al., 2021). Behavior refers to the behavior or actions of individuals that can be observed by others. In other words, behavior is what a person says or does that is the result of his thoughts, feelings, or beliefs (Ajzen, 2020). There are two choices of actions he will take, namely safety behavior and unsafe behavior. Safety behavior talks about a person's tendency to behave in relation to BBS (Hadi et al., 2017).

Behavior based safety is a system used by companies to change unsafe employee behaviors and attitudes (Nunu et al., 2018). Behavior based safety educates employees to look for the proposed implementation of Behavior Based Safety in Disc-Pad Operators as an effort to improve work safety the root cause of accident-prone behavior. This makes employees aware of behavioral tendencies that lead to a high risk of workplace accidents (Kao et al., 2019). To create a safer atmosphere for all, observed behaviors are recorded and discussed in meetings. Behavior-based safety is the practice of identifying hazards and evaluating potential risks in the workplace so that they can be considered acceptable when doing tasks that include interacting with the activities, goods, and services provided. (Abella et al., 2023).

Behavior modification programs have become popular in the safety domain because it is proven that most accidents are caused by unsafe behavior (Kim et al., 2021). Given that safety behavior is a form of behavior, the approach used to reduce or prevent accidents is a behavioral approach. One of them, the ABC model, according to ABC theory, antecedents or activators can lead to a behavior to get the expected consequences (reward) or avoid unexpected consequences (penalty) (Ahn et al., 2013).

Thus antecedents direct a behavior and consequences determine whether the behavior will reappear Based on data from the results of Safety Intervention Strategies (By National Safety Council) on the results of 7 studies and 2444 subjects, regarding safety programs it was concluded that the behavioral approach reached the largest percentage as the most effective method in reducing workplace accidents, namely 59.6% With the implementation of this safety program, it can explain all the activities in the company, find out the unsafe behavior of workers significantly which can reduce the possibility of accidents (Kirk et al., 2019). Work accidents can be caused by two factors, namely unsafe actions and unsafe conditions (Sætrevik & Hystad, 2017; Zhang et al., 2016). Several studies have proven that companies have created and implemented behavior-based safety programs to prevent or reduce the risk of possible work accidents (Guo et al., 2018; Nunu et al., 2018; Wang et al., 2018). However studies that describe the application of behavior based safety with the DO IT method are still rarely studied. This study aimed to determine the application of behavior-based safety with the DO IT method in Pertamina.

METHODS

This research was conducted using a descriptive method that describes the application of behavior-based safety with the DO IT method which is carried out by means of observation and measurement. The observation process is assisted by Critical Behavior Checklist (CBC) and Visible Safety Leadership tools. The results of the calculation in both ways are continued by calculating the percent of safe behavior, then continued with analysis and making improvement concepts. The location of this research is PT Pertamina (Persero) at makassar city . The population in this study are: Pertamina workers as many as 30 samples , the population in this unit is 30 people with a total sampling technique. the reason for choosing the location of the application of the DO IT monitoring method has not been fully carried out in companies that already have ISO.

Table 1
Observation Results in Pertamina

Observation	Frequency	Percentage
Execution on safety briefing		
Safe	20	66.6
unsafe	10	33.4
Execution on safety briefing		
Safe	17	56.6
unsafe	3	43.4
Complince with operational procedure		
Safe	16	53.3
unsafe	14	46.7

As the object of research is labor, work processes, potential hazards that exist, work attitudes, equipment and machinery used in the Central Procesing Area JOB Pertamina. The instruments used in this study from DO IT method were observation sheets or checklists, interview guidelines, and other tools such as mobile phone recorders, and mobile phone cameras for documentation. The data collected in this study are primary data obtained from observations of work behavior and used informant consent with indepth interviews with to get a picture of work behavior. In addition, secondary data from the company was also used as a complement. This research uses descriptive method for data analysis for the criteria used are in accordance with the standards of the Occupational Safety and Health Act.. The analysis consists of stages: data reduction, data presentation, and conclusion drawing which are carried out continuously until the data is considered saturated. The limitation of this research is that it only conducts "define" and "observe" without intervening and testing. research ethics number UMI No 23-055206/2023.

RESULTS

Defining target behaviors (define) In this study, after discussing with the Head of Quality Control, the target behaviors included: a) Use of Personal Protective Equipment (PPE); b) Implementation of work safety briefings; c) Compliance with operational procedures. Observing worker behavior (observe) After determining the target behavior, closed observation of workers in the Daily Check section was conducted. Observations were made using an observation guide and the percentage was calculated using the Critical Behavior Checklist formula 1.

$$\% \text{ Safe} = \frac{\text{Total Safe Observation}}{Total\ Safe + Risk\ Observations}\ x\ 100\% \quad (1)$$

Based on table 1, the findings of the observation revealed that the workers used PPE equipment like a safety helmet, pack, shoes, and gloves in a safe manner. However, some employees engaged in risky practices when wearing PPE, such as safety glasses and earplugs, resulting in a 66.6% application rate for PPE. As a result of the observation, it was discovered that the majority of workers (56,6%) had demonstrated safe behavior with reference to the execution of the safety briefing. A safety briefing was held at the Pertamina's Daily Section. According to the findings of the observation, the majority of workers (53,3%) had demonstrated safe behavior with regard to adherence to operating procedures. A safety briefing was held at the Pertamina's Daily Section.

Table 2 shows the stages of BBS implementation which were analyzed using the DO IT method referring to 5 criteria. At the define stage to explain the priority of the BBS target to the Pertamina company. The observe stage is an effort to monitor according to the BBS target. Then the intervention stage is carried out to correct the risky behavior found from the observations of Pertamina employees. And the test stage is carried out to measure BBS efforts, especially those related to occupational safety and health management.

DISCUSSION

Before work begins in each part, a safety briefing is held to go over work preparation. Regarding the execution of the safety briefing, the majority of the employees at the Daily Check division had displayed safe behavior. At the Daily Check area, a safety briefing had taken place however this activity was not done on a daily basis (Xue et al., 2020). This might be as a result of the manager realizing that all

Table 2
Implementation of BBS with DO IT Method for Pertamina Officers

Define	Observe	Intervene	Test	Regulations
Implementation of tool box meeting	Toolbox meetings are not conducted daily by some sections.	HSE participation as a speaker once a week in the fabrication division	Awareness of the fabrication division is considered to be more thanwith other divisions	OHSAS clause 4.4.3 Consultation and communication
PPE usage behavior	All workers wear PPE appropriate to the potential hazards in the workplace.	Installation safety sign	Workers are responsive to reminding visitors who are incomplete in the use of PPE	Minister of Manpower and Transmigration of the Republic of Indonesia Number PER.08/MEN/VII /2010 on Personal Protective Equipment
Implementation OHS training	Every worker who is new must follow K3 training. In the training training, the material that must be understood by workers include Basic Fire Fightingand H2S	Refreshing, Training every week	At the time of Held simulation circumstances emergency simulation, the ERT was running well according to division of tasks	Minister of Manpower and Transmigration of the Republic of Indonesia Number PER.08/MEN/VII/2010 on Personal Protective Equipment
Behavior compliance to work procedures	Workers have complied with procedures that procedures in every work task.	a) Permit To Work b) Existence of work instructions	The Workers have the mindset that the responsibility for safety lies with each individual	OHSAS clause 4.4.6 Control Operations
Worker participation in the OHS agenda	General a) Safety Meeting: held every 1 month with participants all employees b) safety cmpaign	1) Providing material that is easy to understand 2) Reward	Workers have an interest in participating in OHS-related activities.	OHSAS klausul 4.3 Consultation and Communication Ministerial Decree No.Kep.245/Men/1990 on National OSH Day communication

of the Daily Check section employees were competent and used to their jobs. The Section Head, however, continued to keep an eye on things and to encourage people to wear their full PPE and to follow the Daily Check section's operating protocols. According to Cooper, an Activator serves as the foundation for every person's conduct and always takes place before a behavior even exists (Di Fabio et al., 2017). An Activator serves as the "trigger" for action as well as the motivation behind something and the impetus for someone to refrain from repeating that action. In general, the implementation of OHS training intervened through this refreshing training has been running well and scheduled, this refreshing training should not only be intended for the HSE Department but also all departments (Guidetti et al., 2022). The implementation of OHS training and refreshing training is in accordance with Law No.1 of 1970 article 9 paragraph 3, which contains: "The management is obliged to organize guidance for all workers under its leadership, in accident prevention and fire eradication as well as the maintenance of occupational health and safety, as well as in providing first aid in accidents." And in accordance with the application of OHSAS clause 4.4.2 Training, care and competence, namely Personnel must be competent to perform tasks that have an impact on OHS in the work.

Competence shall be determined on the basis of education, training and/or experience.According to research conducted which analyzes safe behavior in construction workers using the Behavior Based safety method (Curcuruto et al., 2015). The results of this study indicate that there is a relationship between knowledge and the application of behavior based safety with a percentage; 93.1%, there is a relationship between safety equipment and the application of behavior based safety and has been fulfilled by the company with a percentage of 93.3%, there is a relationship between K3 regulations in force in the company with the application of behavior based safety with a percentage of 90%. According to research that the variables of knowledge, attitudes, actions, coworkers, communication and training have a relationship with safe behavior. The actions or changes of a person or a number of workers could minimize the potential ofwork accidents (Golkar et al., 2015). Working according to the assigned responsibility, taking precautions regarding potential hazards, successfully securing the work area and the people in it, maintaining safety equipment in good working order, using the appropriate safety equipment, properly donning PPE, and arranging tools and equipment in the designated location are some examples of safe behaviors. (Knowles & Olatunji, 2021).

Workers' compliance at work to be more cautious, follow work instruction or work regulation, work in accordance with processes, and presence of inspection from the safety section or supervisor are examples of how work instruction is described. This is in accordance with Chapter 10 Paragraph (2) of Government Regulation No. 50 of 2012 on the Implementation of SMK3 (Government Regulation No. 50 of 2012 on the Implementation of OSH Management Standard), which states that the company is supported in implementing the OSH plan by personnel in the OSH, facilities, and supporting components. The SOP, information, reporting, documentation, and job instruction are the facilities and auxiliary elements. (Vierendeels et al., 2018).

The intervention provided for workers' participation in the K3 agenda, especially in the safety campaign event, is the provision of rewards / prizes announced at the K3 month closing event and displaying the work of the winners such as, installing K3 slogan barners who are winners / runners up in front of the CPA and pad B gates. With this kind of reward, it is hoped that it will increase the motivation for participation next year and increase workers' awareness of safety (Rusyda & Abdul Aziz, 2021).

Therefore, eliminating risky conduct is the only way to prevent workplace accidents and improve safety performance. Focusing on risky conduct instead of the number of workplace accidents also results in a superior safety performance score for the organization. (Sharpe et al., 2022). If the company focuses on the number of workplace accidents, the safety management system tends to be reactive, the company only pays attention to safety if the number of workplace accidents increases compared to the previous year (Uehli et al., 2014). Conversely, the behavioral safety approach tends to be proactive, because with this approach the company tends to try to identify any unsafe behavior that arises so that it can be directly addressed (Toppazzini & Wiener, 2017).

The findings of this study were consistent with the ABC model's idea of antecedent, behavior, and consequences. According to the ABC model, a behavior is initiated by a series of antecedents (something that comes before the behavior and a cause associated with the activity), which are then followed by consequences (the effects of the individual behavior), which either raise or decrease the likelihood that the behavior will be repeated. By rearranging and altering the pattern of the antecedent and the consequence, ABC analysis makes it easier to recognize and modify a behavior in order to enhance the frequency of expected behavior. Cooper asserts that an activator's function not only influences behavior but also has the potential to prevent it from occurring. The weakness of this method is in terms of monitoring supervision which is often not continuously carried out.

Prohibition of harm in any form is one of the basic principles of life regulated by Islam. Popular history that narrates this is a hadith which means:

> *"There should be neither harming nor reciprocating harm."* (HR. Ibnu Majah)

This hadith is one of the selected hadiths compiled by Nawawi (2017) in his book al-Arba'in al-Nawawiyah. A book that contains hadiths about the main points of religion. In other words, the hadith is a very important principle to understand and practice. This brief hadith indicates that it is forbidden for us to physically or verbally hurt ourselves or others. On a larger scale, our actions shouldn't hurt the environment, wildlife, animals, or plants. A person who engages in harmful activity may experience it himself afterwards. owing to what the Prophet once said:

> *"Whoever harms a Muslim, Allah will harm him..."* (HR. Abu Dawud and al-Tirmidhi)

The linkage of this hadith with work safety can also be interpreted as a safe and comfortable way of behaving and acting, both for the workers themselves and for other workers. The main causes of accidents in industry come from humans, one of which is due to low discipline and lack of training for employees at work (Thorvaldsen et al., 2015). In addition to employee compliance with regulations issued by the industry, high education and integrity factors can reduce the risk of accidents (Liu et al., 2020).

CONCLUSIONS

This study proves that most of the workers have demonstrated safe behavior related to compliance with operational procedures at Pertamina. The DO IT method is an effective and efficient method for industries that do not have a good OHS management system in a company. This is because this method is able to quickly change unsafe behavior (unsafe act) into safe behavior (safe act) at a low cost. It is recommended that Pertamina apply the DO IT method in carrying out health and safety supervision for workers. For stakeholders to socialize the method to the company as an effort to prevent

work accidents. Future researchers are expected to review the Do IT Method qualitatively in order to obtain in-depth interview results.

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AUTHORS' CONTRIBUTIONS
Alfina Baharuddin wrote the manuscript. designed the study, formulated the concept, read and approved the final manuscript Suhani A. Fachrin acquired the data, analyzed the data, and revised the manuscript. Widya Eka Puspita enrolled participants and collected data

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COMPETING INTERESTS
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